

Application No. 10/645,333
Filed: August 21, 2003
TC Art Unit: 1742
Confirmation No.: 7603

REMARKS

Claims 1-8 are pending. Claims 1, 4 and 6-8 are currently amended to correct spelling and grammar, in order to improve clarity.

Claim Rejections Under 35 USC 103(a)

The Examiner has rejected claims 1-8 under 35 U.S.C. 103(a) as being unpatentable over Kato et al. in view of Withers et al. and Jin et al.

The method claim 1 comprises the following steps.

- (a) mixing a carbon nano material with a metal material in a powder state;
- (b) compressing a resultant mixed material to a sheet-shaped solid material by a hot press; and
- (c) forming said sheet-shaped solid mixed material into granules, such as chips, pellets, and the like.

Then the composite metal product is obtained from said granules by the following steps.

- (d) melting the metal in the granules and kneading the metal and carbon nano material to form a composite material by using an injection machine;

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- (e) injecting the composite material into a mold to form the composite metal product by using an injection machine; and
- (f) obtaining the composite metal product.

The patentable value of the present invention as claimed above is recited precisely on page 2, line 25 to page 3, line 7 of the present specification.

Kato et al. discloses a process comprising the steps of melting a metal material, injecting said melted material into a mold to form a product and obtaining the product. Kato et al. discloses that metallic feed is composed of particles in the form of grains or columns or in the forms of shavings. However, Kato et al. does not disclose a method comprising the steps of (a), (b) and (c) for producing a solid granulated material containing a carbon nano material and a metal material and does not disclose a composite metal product containing the carbon nano material and the metal material from said solid granulated material. Also, Kato does not disclose a sheet-shaped solid material obtained by compressing by hot press as an intermediate material for forming the granulated material.

The Examiner states that newly cited reference Withers et al. teaches to add carbon nanotubes to metals in the same field of

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endeavor for the purpose of improving the strength of the formed material while decreasing density (col. 8, lines 7-26).

However, at Column 8, lines 7-26, Withers discloses to infiltrate ceramic particle arrays having submicron/nanometer with aluminum by pressure infiltration. Therefore, Withers fails to disclose the steps of (a), (b) and (c) of the present invention. Withers also does not teach the steps of (d), (e) and (f).

The Examiner states that newly cited reference Jin et al. teaches to form a billet of a metal matrix comprising nanotubes by mixing the nanotubes with the metal matrix material, and using heat and pressure to convert the powder into matrix billet (col. 21-67), to allow for high loading of the nanotube material.

Jin discloses an improved process for fabricating nanotube field emitter structures (Abstract). Although Jin discloses to form an ingot comprising a metal matrix with carbon nanotubes, said ingot is cut to form a field emitter. Jin does not disclose the steps of (d), (e) and (f) of the present invention. Furthermore, since Jin and Kato are not in the same technical field, it is not proper to combine Jin and Kato.

Neither Kato, Withers nor Jin teach or suggest the step claimed in Applicant's claim 1 of "melting the metal in the granules and kneading the metal and carbon nano materials to form

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a composite material", wherein said step follows after the sequence of steps: (a) mixing these materials in a powder state, (b) compressing the resultant mixed material to a sheet-shaped solid material, and (c) forming the solid material to granules, all as is claimed in Applicant's claim 1.

Claim rejections on the ground of nonstatutory obviousness-type double patenting

The Examiner has rejected claims 1-8 on the ground of nonstatutory obviousness-type double patenting over claims 1-6 and 1-4 of USP Nos. 6,860,314 and 6,874,563, respectively, issued to Koide et al.

The Applicant traverses this rejection insofar as it pertains to the reference Jin et al., for the reason that, while Jin admittedly teaches heating and pressing, Jin does not teach or suggest combining carbon nano material and metal material to form a compressed, sheet-shaped, solid material that is subsequently formed into granules to be used as a feedstock for injection molding by using an injection machine. Instead, Jin merely discloses forming an ingot and said ingot is cut to form a field emitter. Examiner admits the two referenced Koide patents to not teach or suggest a compressed, sheet-shaped solid material

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subsequently formed to granules. Therefore, these references, even taken all together, do not teach or suggest all the limitations of Applicant's invention as claimed in claim 1.

The foregoing traversal notwithstanding, Applicant is willing to file a terminal disclaimer as suggested by the Examiner in order to more completely overcome this rejection.

SUMMARY

Claims 1-8 are pending. Examiner's rejections have been traversed. This Response puts the claims into proper form for allowance, which allowance is requested.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter which would expedite allowance of the present application.

Respectfully submitted,

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